



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,877	09/11/2003	Tatsuo Fukushi	58079US004	5006

32692 7590 06/16/2005

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER

HU, HENRY S

ART UNIT	PAPER NUMBER
----------	--------------

1713

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/659,877	Applicant(s) FUKUSHI ET AL.	
	Examiner Henry S. Hu	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Election of April 26, 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 1,5 and 17-19 is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2 pages</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the faxed Election filed on April 26, 2005. **Claims 1-20 are now pending**, while the nonelected **Claim 17** is withdrawn from consideration. An action follows.
2. **Applicant's election of Group I, Claims 1-16 and 18-20 and with formula (I) as the elected species is traversed with remarks on page 3.** The traversal is on the ground(s) that it would not place an undue burden to search and examine the non-elected Group II (Claim 17) with the elected Group I since they are so closely related in the field of curable fluoropolymer compositions. This is not found persuasive because each of Group I and Group II is drawn to a technology apparently requiring search in different classification area. In the instant case Group I was drawn to a compound comprising a copolymer of one or more perfluorinated ethers of formula I and II, while Group II was drawn to a different compound comprising a terpolymer of vinylidene fluoride with one or more perfluorinated ethers of formula I and II.

As discussed earlier, compounds in Groups II and I are **actually two different curable fluoropolymer compositions** due to the presence or absence of other components and may other step required. For instance, Group II requires the specific use of vinylidene fluoride so that it may cause somewhat different crosslinking reactions in comparing with the non-hydrogen containing monomer. Although perfluorinated ethers of formula I and II are used in both cases,

Art Unit: 1713

Invention I relates to a copolymer may be only made from perfluorinated ethers, while Invention II is restricted to use both vinylidene fluoride with perfluorinated ethers. Since they are two different copolymers, which in some cases may be from different polymerization and with different properties, they are therefore different inventions.

With the presence of hydrogen atoms in the backbone, vinylidene fluoride-containing polymers are behaving different from perfluoropolymers in view of the structure and properties, as it is well known in the art. Furthermore, the process of making is unique and thereby not interchangeable. Therefore, the scope of the claims, i.e., the metes and boundaries are distinct.

The requirement is still deemed proper and is therefore made FINAL. In summary, this application contains original **Claim 17**, which is drawn to an invention non-elected with traverse. A complete reply to the final rejection must include **cancellation of non-elected claims** or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Specification

3. The disclosure is objected to because of the following informalities:

(a) On **page 4**, lines 10-11, the information is needed to updated and completed.

(b) On **page 5**, line 22, recitation of “Y(CF₂)_qY” has two errors and should be changed to “Y(CF₂)_qY” without using any space.

Art Unit: 1713

(c) On **page 5** at line 21, recitation of “ R_2 U” should be changed to “ **R_2 -U**” by using a dash line. Otherwise it is not clear whether they are connected or not.

(d) On **page 5** at line 22, recitation of “ $Y(CF_2)_q Y$ ” has two errors and should be changed to “ **$Y(CF_2)_q Y$** ” without using any space.

(e) On **page 6**, line 6, recitation of “di(tbutylperoxy)hexane” should be changed to “**di(t-butylperoxy)hexane**” in order to be consistent with the same wording used on page 4 at line 33.

(f) On **page 7**, line 26, recitation of “n- heptyl” should be changed to “**n-heptyl**” without using any space.

Appropriate corrections for (a) - (f) are required.

Claim Objections

4. Claims 1, 5 and 17-19 are objected to because of the following informalities:

(a) On **Claim 1**-(b) at line 1, **Claim 17**-(b) at line 1, and **Claim 18**-(b) at line 1, a clear and precise rewriting is needed. Otherwise, it may mean at least one filler is used at least 10

Art Unit: 1713

parts per 100 parts of component (a). Additionally, it may also mean such a filler is functionally curable (However, the fillers shown in Claim 11 is not curable)

(b) On **Claim 1**-(b) at line 3, **Claim 17**-(b) at line 3, and **Claim 19** at line 2, all three recitations of “**TR-10 of -20°C or less**” are not commonly known in the art. The examiner suggests it is better to rewrite by using whole name “**Retraction at lower temperature**” as disclosed on page 20 at lines 9-10.

(c) On **Claim 5** at line 3, recitation of “**R_f2 U**” should be changed to “**R_f2-U**” by using a dash line. Otherwise it is not clear whether they are connected or not.

(d) On **Claim 5** at line 4, recitation of “**Y(CF₂)_q Y**” has two errors and should be changed to “**Y(CF₂)_qY**” without using any space.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claim Rejections - 35 USC § 103

Art Unit: 1713

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. The limitation of parent *Claim 1* in present invention relates to **a compound comprising:**

(a) **an amorphous copolymer** including interpolymerized monomeric units derived from one or more **perfluorinated vinyl ether monomers of Formula I or II**; and (b) **a curable component including at least one filler having at least 10 parts per 100 parts of component (a), such that upon vulcanization the resulting compound has a Shore A hardness according to ASTM D2240 of 60 or greater, a TR-10 of -25°C or less, and a permeation of 65 (g-mm/m²-day) or less.**

Other parent *Claim 18* relates to the process of making an elastomer from vulcanizing a compound of *Claim 1*. See other limitations of dependent *Claims 2-16 and 19-20*.

Art Unit: 1713

8. Claims 1-15 and 18-20 are rejected under 35 U.S.C. 102(a) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Grootaert et al. (WO 02/060968 A1 which is equivalent to its US 6,730,760 B2).

It is noted by the examiner that all the citations herein are based on its US patent.

Regarding the “**curable compound**” limitation as disclosed in parent composition **Claim 1** and parent process **Claim 18**, **Grootaert et al.** disclose a method of making a curable fluorinated elastomer composition comprising: (A) a fluoroelastomer comprising perfluorovinyl ether having a formula of $\text{CF}_2=\text{CF}-(\text{O}(\text{CF}_2)_n)_m-(\text{OCF}_2)_x-\text{OR}_f$ (it would be reading on the claimed **formula I when m is 1**) (column 3, line 45 – column 4, line 30; column 3, line 23-39), (B) a mixture of curative along with its coagent which is curable by peroxide (column 8, line 3 – column 9, line 16). **Grootaert et al.** further disclose that other type of curable component may be from nitrile- or halogen-containing monomer (column 9, line 1-16; column 6, line 64 – column 7, line 31). Conventional **filler or additive** can be included (column 9, line 29-49). Additionally, a low temperature curing at the temperature above 95 °C is disclosed (column 10, line 12-15). **Grootaert et al.** furthermore disclose that the cured sample has **a Shore A hardness of 78** from the measurement with ASTM D2240-85 method (column 12, line 24; column 11, line 20-22).

9. With respect to other claimed properties on vulcanized product, **Grootaert** is silent about (A) a TR-10 of -25°C or less and (B) a permeation of 65 (g-mm/m²-day) or less. In light of the fact that the prior art and the present invention recite **substantially identical curable composition comprising fluorinated copolymers made from a claimed perfluoroalkoxyalkyl**

Art Unit: 1713

vinyl ether and may be polymerized in the same process, a reasonable basis exists to believe that the products of the invention inherently possess the same vulcanized properties on TR and permeation. Since PTO does not have proper means to conduct experiments, the burden of proof is now shifted to Applicants to show otherwise. *In re Best*, 195 USPQ 430 (CCPA 1977). See MPEP 2112-2112.02.

It has been held that where applicant claims a composition in terms of function, property or characteristic where said function is not explicitly shown by the reference and where the examiner has explained why the function, property or characteristic is considered inherent in the prior art, it is appropriate for the examiner to make a rejection under both the applicable section of 35 USC 102 and 35 USC 103 such that the burden is placed upon the applicant to provide clear evidence that the respective compositions do in fact differ. *In re Best*, 195 USPQ 430, 433 (CCPA 1977); *In re Fitzgerald et al.*, 205 USPQ 594, 596 (CCPA 1980).

10. Regarding **Claims 2-3 and 8-9**, the polymers can be a terpolymer or a quadpolymer according to the disclosure on **column 5 at line 24-29** by a mixture of monomers along with some of cure site monomers containing nitrile or halogen disclosed at column 9, line 1-16; column 6, line 64 – column 7, line 31.

Regarding **Claim 4**, the liquid hexafluoropropylene monomer can be also included (column 5, line 49-53).

Regarding **Claims 5-7**, Grootaert discloses that iodine- and bromine-containing monomers are all included and in some cases the bromine atom may be connected directly to the double bond (column 9, line 1-16; column 6, line 64 – column 7, line 31).

Art Unit: 1713

Regarding **Claim 10**, it is an emulsion polymerization, see working examples.

Regarding **Claim 11**, all the conventional filler or additive can be included (column 9, line 29-49).

Regarding **Claims 12-13**, Grootaert et al. have disclosed including some acid acceptors such as **calcium hydroxide** and the like (column 9, line 50-60).

Regarding **Claim 14**, since a cure site monomer or a diiodine compound is incorporated in the copolymer for crosslinking purpose, the final cured product would carry the claimed or similar mechanical properties due to the presence of reactive sites in the copolymers.

Regarding **Claim 15**, it is peroxide curable as discussed in Claim 1 (column 8, line 3 – column 9, line 16).

Other parent **Claim 18** relates to the process of making an elastomer from vulcanizing a compound of Claim 1. Remaining **Claim 18-20** are thereby rejected with the same reason the above rejections of Claims 1-15.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grootaert et al. (WO 02/060968 A1 which is equivalent to US 6,730,760 B2) in view of Guerra et al. (US 5,384,374).

The discussion of the disclosures of the prior art of Grootaert for Claims 1-15 and 18-20 of this office action is incorporated here by reference. Regarding **Claim 16**, Grootaert is silent about using a bisphenol curable compound. **Guerra** et al. teach that when curing fluorocarbon elastomer mixture containing fluorinated ether composition, **either a bisphenol curing system or a peroxide cure system can be used** (column 5, line 3-60, particularly see line 10-12; column 4, line 17-27). By doing so, excellent low-temperature flexibility can be obtained while remaining the desired physical properties.

Bisphenol curing system is thereby functional equivalent and interchangeable with peroxide cure system based on Guerra's disclosure. In light of the fact that both of the involving references are making the same type of curable fluorinated elastomer containing similar or the same vinyl ether units, one having ordinary skill in the art would therefore have found it obvious to replace **Grootaert's peroxide curing system with bisphenol system** as taught by Guerra. One would expect the same success. Additionally, with an advantage as such a replacement would obtain excellent low-temperature flexibility while remaining the desired physical properties.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a curable compound comprising (a) an amorphous

Art Unit: 1713

copolymer from at least one perfluorinated vinyl ether of Formula I or II, (b) a curable component, and (c) at least one mineral filler:

US Patent No. **6,191,208 B1 to Takahashi et al.** disclose a curable perfluoroelastomer composition comprising (A) a perfluoroelastomer having units of TFE, PAVE and a nitrile-containing monomer, (B) a curing agent, and (C) anhydrous silica (abstract, line 1-7; column 1, line 50-62). The nitrile-containing monomers are 8-CNVE or the like, which are related to derivatives of perfluorinated vinyl ethers (column 2, line 60 – column 3, line 25). However, **no claimed perfluorinated vinyl ether with formula I is used in the copolymer at all.**

Therefore, Takahashi fails to teach or fairly suggest the limitation of present invention.

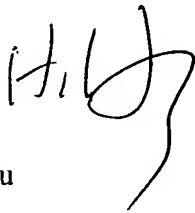
13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

Art Unit: 1713

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

June 13, 2005



DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700